Determination of Volatile Amines using an Agilent J&W Select CP-Volamine GC Column

Application Note

Introduction

Volatile amines are among the most demanding analytes in gas chromatography due to their basic properties. The Select CP-Volamine WCOT fused silica column, coated with a base deactivated non-polar siloxane type stationary phase, is optimized for the separation of these amines. The application of proprietary base deactivation techniques creates a highly inert coating surface with a minimum degree of absorption for difficult basic compounds. The thick film siloxane type liquid phase coating layer offers optimal inertness as well as sufficient retention for the analysis of highly volatile and basic substances, such as methylamine and dimethylamine.

The improved column inertness of the Select CP-Volamine column is evident from the good peak shape for these two difficult compounds in the chromatogram. The column also exhibits excellent stability for basic aqueous samples resulting in longer lifetimes even for these demanding samples. Figure 1 shows the separation of a complex mixture of amines in water, including the most volatile types.
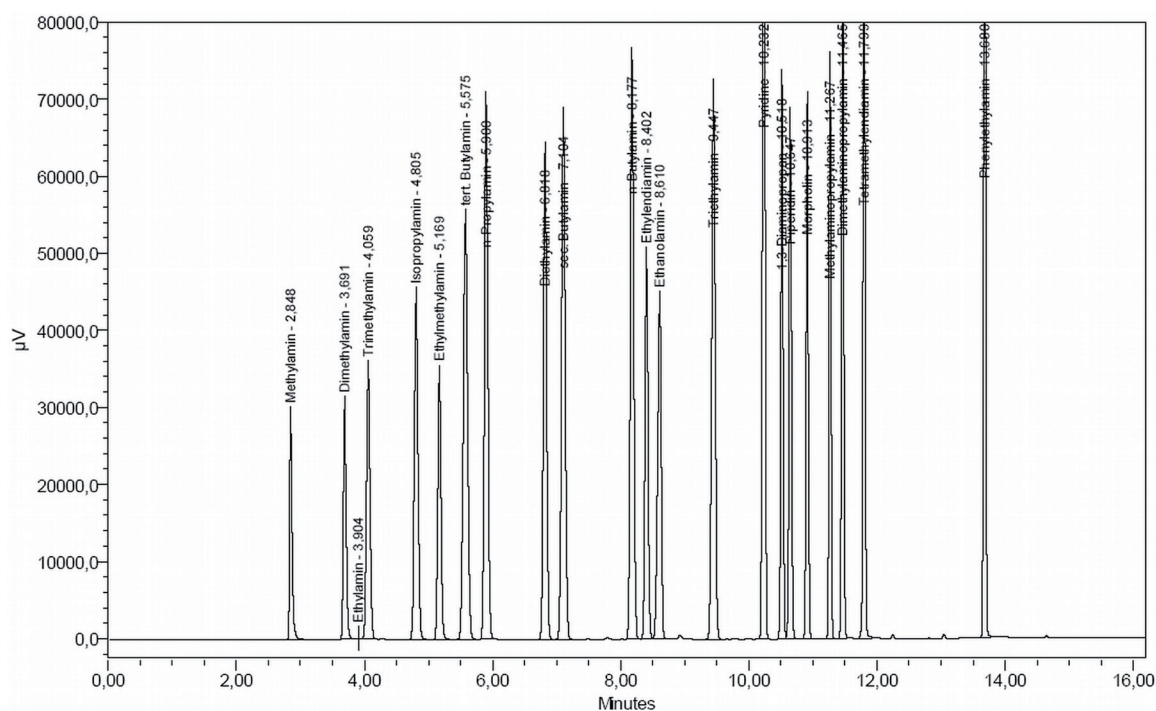
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Conditions

Technique:	GC-FID
Column:	Select CP-Volamine, 30 m x 0.32 mm (part number CP7447)
Sample Solvent:	Water
Carrier Gas:	Helium, 2.0 mL/min constant flow
Injector:	Split/splitless; Splitflow: 1:50 Temperature: 200 °C
Injection Volume:	0.5 µL
Concentration:	~ 20-50 mg/mL (except for ethylamine)
Temperature:	40 °C (2 min), 11 °C/min, 120 °C, 33 °C/min, 250 °C (3 min)
Detection:	FID, 240 °C

Table 1. Peak Identification

Peak	RT (min)	Name
1	2,848	Methylamine
2	3,691	Dimethylamine
3	3,904	Ethylamine previously established retention time, baseline separated from DMA and TMA).
4	4,059	Trimethylamine
5	4,805	Isopropylamine
6	5,169	Ethylmethylamine
7	5,575	tert Butylamine
8	5,900	n-Propylamine
9	6,818	Diethylamine
10	7,104	sec Butylamine

Peak	RT (min)	Name
11	8,177	n-Butylamine
12	8,402	Ethylenediamine
13	8,610	Ethanolamine
14	9,447	Triethylamine
15	10,232	Pyridine
16	10,518	1,3-Diaminopropane
17	10,647	Piperidine
18	10,913	Morpholine
19.	11,267	Methylaminopropylamine
20.	11,465	Dimethylaminopropylamine
21.	11,799	Tetramethylendiamine
22.	13,680	Phenylethylamine

Separation of a mixture of volatile amines using a Select CP-Volamine GC column and flame ionization detection (FID)

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